420.04.03 Wing walls and footings for reinforced concrete box culverts will not be measured but the cost will be incidental to the Reinforced Concrete Box Culvert item.

420.04.04 Parapets (including end posts) on bridges, wing walls, reinforced concrete box culverts and retaining walls, or concrete median barriers on bridges and top slabs of reinforced concrete box culverts will not be measured but will be paid for at the Contract lump sum price for the pertinent Concrete Parapet or Concrete Median Barrier items.

420.04.05 Parapet and end post modifications on bridges, wing walls, reinforced concrete box culverts and retaining walls, or concrete median barriers on bridges and top slabs of reinforced concrete box culverts will not be measured but will be paid for at the Contract lump sum price for the pertinent Parapet Modification item. The payment will also include saw cutting, removal of portions of the existing parapet or end post, drilling, and grouting.

420.04.06 Floodlighting will be measured and paid for at the Contract unit price per each night used, including fuel, backup generator, setup, relocation, and removal.

420.04.07 Linseed oil protective coating will be measured and paid for at the Contract unit price per square yard for the pertinent Linseed Oil Protective Coating item.

420.04.08 Temporary supports or piling will not be measured but the cost will be incidental to the formwork.

420.04.09 Retaining walls will be measured and paid for as specified in 450.04

SECTION 421 — REINFORCEMENT FOR CONCRETE STRUCTURES

421.01 DESCRIPTION. This work shall consist of furnishing and placing reinforcement, including deformed steel bars, wire mesh, and plain round steel spiral bars, as specified in the Contract Documents or as directed by the Engineer. Reinforcement shall be uncoated or epoxy coated as specified in the Contract Documents.

421.02 MATERIALS.

Grout	902.11(c)
Deformed Steel Bars	908.01

Plain Round Steel Bars for Column Spirals	908.02
Wire Mesh	908.05 and 908.06
Fusion Bonded Epoxy Powder Coating for Steel and Touch Up System	Section 465 and 917.02
Galvanizing	A 153

421.02.01 Supports. Material for all supports shall be approved coated metal, plastic, plastic tipped, or galvanized. Aluminum is prohibited. All materials shall be acceptable to the Engineer.

The wire supports for epoxy coated steel bars shall be completely covered with 1.5 to 9.0 mils of adherent epoxy coating except for minimum necessary contact marks. The reinforcement steel shall be held in place with plastic coated tie wires fabricated for this purpose.

Steel bars used as supports for epoxy coated steel bars shall be epoxy coated in the same manner as reinforcement steel.

421.03 CONSTRUCTION.

421.03.01 Working Drawings. The Contractor shall submit working drawings to be approved by the Engineer prior to the start of any fabrication unless otherwise specified. Details shall conform to TC-4.01.

421.03.02 Plan Dimensions. All dimensions related to reinforcement steel are out to out measurement except the spacing is measured center to center.

421.03.03 Cutting and Bending. Reinforcement bars shall be cut and bent at the mill or shop to the shapes specified in the Contract Documents before shipment to the job site. Reinforcement bars shall not be bent in the field except to correct errors, damage by handling and shipping, or minor omissions in shop bending.

Epoxy coated reinforcement bars on skewed bridges and in other locations that are specified to be cut in the field shall be either sawed or sheared; flame cutting is prohibited.

All bending shall conform to the Specifications tolerances modified to cover requirements as specified in the Contract Documents.

421.03.04 Shipping, Handling, and Protection of Material. Reinforcement steel bars shall be shipped in standard bundles and tagged and marked in conformance with the provisions of the Code of Standard

Practice of the Concrete Reinforcing Steel Institute. Bundles shall be kept intact and material undamaged and properly identified until ready for use.

Coated steel shall be bundled together for shipment using excelsior or other materials as approved by the Engineer and banded using plastic or padded metal bands. All lifting shall be performed with a strong back and multiple supports consisting of a sufficient quantity of straps or slings to prohibit abrasion within the bundle from excessive bending or distortion.

Regardless of the type of surface the bundles are to be stored upon, all bundles shall be stored at the site on suitable blocking or platforms at least 4 in. above the surface or vegetation. They shall be kept free from vegetation growth, accumulations of dirt, oil, or other foreign material. Blocking shall be sufficiently close to avoid bending and distortion of the bars. Any distortion of the bars or damage to epoxy coating shall be corrected as directed by the Engineer at no additional cost to the Administration. Damage to the epoxy coating shall be touched up in conformance with 465.03. Epoxy coated bars shall be adequately covered for protection from ultraviolet rays from the time of delivery when they are to be stored outside for more than 90 days.

421.03.05 Placing and Fastening. All reinforcement steel, including dowel bars, shall be accurately placed in the position specified in the Contract Documents or working drawings, and firmly held during the depositing and setting of the concrete. Inserting reinforcement steel or dowel bars into plastic concrete is prohibited.

Bars shall be tied at all intersections except alternate intersections need not be tied where spacing is less than 1 ft in each direction. On bridge decks and the top slabs of box culverts, all intersections shall be tied in the top mat of reinforcement. Reinforcement steel bars embedded in concrete shall not be bent after they are in place.

Before any concrete is placed, all mortar shall be cleaned from the reinforcement. Concrete shall not be placed until reinforcement bars are inspected and approved by the Engineer. This shall not relieve the Contractor of the responsibility for any shifting of the bars during the placement of concrete.

Reinforcement bars shall be supported and their distances from faces of forms shall be maintained by means of approved templates, blocks, ties, hangers, or other supports. Bars in the bottom of footings shall be supported on approved precast concrete blocks with embedded tie wires or suspended in place. Bars in the tops of footings shall be supported by supports that are approved by the Engineer.

Metal, metal with plastic tipped legs, or plastic chairs shall not be used against formed surfaces that will be exposed in the finished structure.

A final visual inspection of epoxy coated steel at the construction site will be made by the Engineer after the steel is in place and immediately prior to placing the concrete. Any areas designated by the Engineer that require repair shall be patched with epoxy in conformance with 465.03. Concrete shall not be placed on a patched area until the patching material is cured for one hour. The Contractor shall allow the Engineer four hours of normal working time after the reinforcement and forms are in place to conduct the inspection.

421.03.06 Splicing. Bars shall be furnished in the lengths and spliced as specified in the Contract Documents and approved shop drawings. There shall be no additional splicing of bars without written approval of the Engineer. Lap splices shall be made with the bars in contact and wired together.

Welding of reinforcement steel or attachments thereto is not permitted without written authorization by the Engineer.

421.03.07 Tying New Concrete into Existing Concrete. On all projects where portions of existing structures are to be used in the finished structure and existing concrete is to be removed, the existing reinforcement steel to be incorporated in the final structure shall be straightened and cleaned. Care shall be taken not to damage these bars.

Any exposed existing reinforcement steel that is to be incorporated into the final structure:

(a) That has lost 20 percent or more of its original cross sectional area as determined by the Engineer, shall be cut out. A new bar of the same diameter shall be provided and placed so as to have the minimum required lap at each end of the new bar, or modified as per (c).

(b) Where the required bar lap length is available, it shall be used as a dowel.

(c) Where the required bar lap is not available or limits of concrete removal to achieve bar lap are too great, a welded or approved mechanical splice shall be provided.

All existing reinforcement steel extending into an area in which epoxy coated reinforcement steel is required shall be abrasive blast cleaned and epoxy coated with the touch up system.

If expected reinforcement steel is missing, or a pattern differing from that shown on the existing Contract Documents is uncovered, then the Office of Bridge Development shall be contacted for evaluation.

Where dowel bars are required to tie new concrete into an existing structure, they shall be installed in conformance with 406.03.

421.03.08 Substitution. Substitution of different size bars will be permitted only when approved by the Engineer. No additional compensation will be allowed for substituting larger size bars in lieu of the bars specified.

421.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for cleaning, coating, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

421.04.01 Reinforcement steel bars or epoxy coated reinforcement steel bars will not be measured but the cost will be incidental to other pertinent items specified unless an item for reinforcement steel bars appears in the Contract Documents.

421.04.02 Reinforcement Steel Bars or Epoxy Coated Reinforcement Steel Bars will not be measured but will be paid for at the pertinent Contract lump sum price.

421.04.03 Reinforcement Steel Bars or Epoxy Coated Reinforcement Steel Bars will be measured and paid for at the Contract unit price per pound based on the original approved overall lengths of bars computed on the basis of the nominal unit weight per linear foot.

421.04.04 Incorporating existing reinforcing steel in the final structure including straightening, bending, splicing, and removal and replacement will not be measured but the cost will be included in the pertinent Concrete item.

SECTION 422 — DAMPPROOFING AND MEMBRANE WATERPROOFING

422.01 DESCRIPTION. This work shall consist of dampproofing and waterproofing of concrete surfaces.

422.02 MATERIALS.

Asphaltic Materials	913.01
Asphalt Primer	913.02